

RE-EVALUATION OF THE *ELAPHRIA FESTIVOIDES* (GUENÉE) SPECIES
COMPLEX (LEPIDOPTERA: NOCTUIDAE)

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Abstract.—*Elaphria alapallida*, new species, is described and illustrated. *Elaphria festivoidea* (Guenée) is re-evaluated and distinguished from *E. alapallida* by the structures of the male vesica and female appendix bursa. In the male genitalia of *E. festivoidea*, the cornuti in the vesica are larger and more numerous than in *E. alapallida*. In the female genitalia of *E. festivoidea*, the appendix bursa is curved behind the corpus bursae, and in *E. alapallida* it projects vertically from lateral margin of corpus bursae. The distribution of collecting dates suggests *E. festivoidea* is at least double brooded and *E. alapallida* is single brooded.

Key Words: *Elaphria alapallida*, *Elaphria festivoidea*, taxonomy, distribution

The *Elaphria festivoidea* (Guenée 1852) species complex was evaluated in a previous paper (Saluke and Pogue 2000) and at that time a new species, *E. cornutinis* Saluke and Pogue was described. After studying additional material and re-evaluating what Saluke and Pogue (2000) recognized as *E. festivoidea*, we determined that an additional species is present. In this paper, we establish the identity of *E. festivoidea* based on type comparison and describe a third species in the *festivoidea* complex.

Elaphria festivoidea (Guenée)
(Figs. 1, 3, 5-8, 13-14, 17, 20)

Celaena festivoidea Guenée in Boisduval and Guenée 1852: 220.

Erastria varia Walker 1857: 808.—Draudt 1926: 220.

Oligia festivoidea: Smith 1889: 147.—Butler 1891: 240.—Smith 1891: 43.—Dyar 1902: 112.

Monodes festivoidea: Hampson 1909:

483.—Barnes and McDunnough 1917: 68.—Draudt 1926: 268.

Elaphria festivoidea: Kimball 1965: 99.—Franclemont and Todd 1983: 141.—Poole 1989: 351.—Poole and Gentili 1996: 739.—Saluke and Pogue 2000: 234, 235 (fig. 2)

Diagnosis.—The forewing size is slightly larger in *festivoidea* than in *alapallida*, which is evident when comparing a series of both species as there is overlap in the absolute measurements. The overall coloration of the forewing is more drab in *festivoidea* than in *alapallida* because of the lack of rufous and white scales in *festivoidea*, though some specimens of *alapallida* also lack the brighter scales. Markings of the forewings are generally less defined in *festivoidea* than in *alapallida*, for example, the claviform spot is indistinct to absent in *festivoidea* and is well developed in *alapallida*. The hindwing in *festivoidea* is darker than in *alapallida*. In the male genitalia the



1

SYM-
TYPEU.S. America.
Doubleday
46-110.*Celaena festivoidea* ♂

2



3

Type

1132

♀

glued on
abdomenColourslide
224

12. ERASTRIA VARIA.

E. Florida
St Johns Bluff.
K. Doubleday.
41-7-29.
15.

4

Figs. 1-4. Type specimens. 1, ♂ Holotype of *Celaena festivoidea* Guenée. 2, Labels from holotype of *Celaena festivoidea* Guenée. 3, ♀ Holotype of *Erastria varia* Walker. 4, Labels from holotype of *Erastria varia* Walker.

number and size of cornuti is diagnostic. In *festivoidea* there are more (range 35-50, mean = 42.4, n = 7) cornuti and the longest cornutus is longer than in *alapallida* (range 0.45-0.70 mm, mean = 0.579 mm, n = 7). In *alapallida* the cornuti are fewer (range 21-35, mean = 27.0, n = 7) and the longest cornutus is shorter than in *festivoidea* (range 0.35-0.50 mm, mean = 0.393 mm, n = 7). In the female genitalia, the appendix bursae curves around to the dorsal side of corpus bursae in *festivoidea*; in *alapallida* the ap-

pendix bursae projects vertically and is not curved around the corpus bursae.

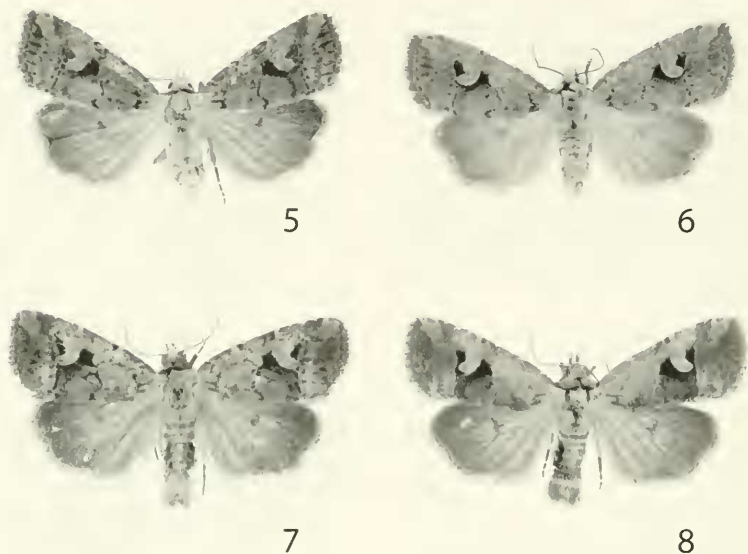
Description.—*Male: Head:* Labial palp with basal and median segments dark gray to black with ventral margin and interior cream, dorsal apex of median segment cream, apical segment cream with a few black and/or rufous scales. Frons with closely appressed scales cream, longer dorsal scales pale rufous to rufous with a varying amount of black scales forming a spot on eye margin where appressed and longer

scales meet. Vertex concolorous with longer scales of frons. Antennal scape white ventrally, with varying amounts of black and rufous dorsally; flagellum gray to black. *Thorax*: Patagium pale rufous to brown mixed with varying amounts of white with a few darker scales. Tegula white with a few darker scales. Dorsal tuft between patagia with cephalic half brown to dark rufous extending laterally to form a margin on tegula, rest white. Mesothorax tan. Metathorax tan with gray apex. Foreleg with femur gray speckled with white; tibia black with median band cream to pale rufous, this lighter medial area can vary in amounts of lighter colored scales; tarsi black with apical rings cream to cream mixed with pink. Midleg with femur white speckled with brown scales; tibia with longer narrower scales in basal two-thirds cream mixed with gray to pale rufous, shorter scales in basal third black with white apical ring; tarsi black with white apical rings. Hindleg with femur and tibia mostly white mixed with gray scales; tarsi gray with white apical rings. *Forewing*: Length 10.5–14 mm ($n = 11$). Basal third of wing ground color very light brown; basal line black (indistinct to absent); antemedial line black, sinuate (indistinct); orbicular spot, indistinct to very faint, round, a few darker scales in center, bordered by black scales nearest reniform spot; claviform spot absent; median line black, borders reniform spot to postmedian line; a trapezoidal area between orbicular and reniform spots may be completely filled with black; area between antemedial and postmedian lines and below orbicular and reniform spots light brown to brown, some specimens with a dark rufous patch; reniform spot very light brown with darker scales internally; postmedian line straight, indistinct, pale, with black scales along proximal border; basal third very light brown to brown; veins outlined with black and white for a short distance from postmedian line; gray along outer margin; fringe with basal half gray and apical half

light brown. *Hindwing*: Ground color gray; fringe white with darker basal line. *Abdomen*: Dorsal tuft on first abdominal segment absent; dorsum gray with an indistinct basal border of white scales; venter a mixture of white and gray scales. *Genitalia* (Figs. 13–14): Uncus curved, widest at proximal end, narrowing after curve to a hooked apex. Tegumen with an enlarged penicillum bearing an elongate, dense peniculum; a shorter, less sparse peniculum at inner base of penicillum. Pleurite C-shaped with a small muscle plate. Valve elbow shaped, curved, vertical, apex round; ampulla arising from near base of valve, curved, constricted medially, apex pointed, a small triangular process just proximal to medial constriction. Juxta rectangulate with proximal margin produced medially into a pointed projection, chevron-shaped. Vinculum V-shaped. Aedoeagus straight, wider at base than at apex; with an elongate, pointed, ventro-distal projection. Vesica initially curves ventrad then curves back around itself and ends dorsal to the apex of the aedoeagus; cornuti arranged in two parallel rows, a dorsal row runs along edge of vesica then curves off this edge apically, a second semicircular lateral row with fewer cornuti; cornuti numerous (range 35–50, mean = 42.4, $n = 7$), with longest cornutus (range 0.45–0.70 mm, mean = 0.579 mm, $n = 7$).

Female: As in male except forewing length 11.0–14.0 mm ($n = 10$). Hindwing slightly darker. *Genitalia* (Fig. 17): Papillae anales with round apex. Ventral plate of ostium bursae an elongate rectangle; distal margin straight. Ductus bursae short, straight, sclerotized; wall invaginated; spiculate; basal projection prominent. Appendix bursae curved behind corpus bursae (Fig. 17). Corpus bursae ovate, narrowest at apex. Signum absent.

Type material.—*Celaena festivoidea* Guenée (Figs. 1–2). The ♂ holotype [BMNH] is labeled: 1) Syn-type, 2) U.S. America. [printed], Doubleday, 46–110.



Figs. 5–8. Adults of *Elaphria festivooides*. 5, ♀, Florida, Highlands Co., Archbold Biol. Sta., 12 Mar. 1997, M. G. Pogue, USNMNT 00063105. 6, ♀, Florida, Putnam Co., Welaka, University Conservation Reserve, 12 Mar. 1962, D. C. Ferguson, USNMNT 63150. 7, ♂, North Carolina, New Hanover Co., MOTSU Buffer, Peter's Point, 13 Sep. 1994, J. B. Sullivan, R. Broadwell, B. Smith. 8, ♂, Alabama, Baldwin Co., Bon Secour NWR, 15 Oct. 1986, T. L. Schiefer, USNM 00063680.

[handwritten], 3) *Celaena festivooides* ♂ [handwritten].

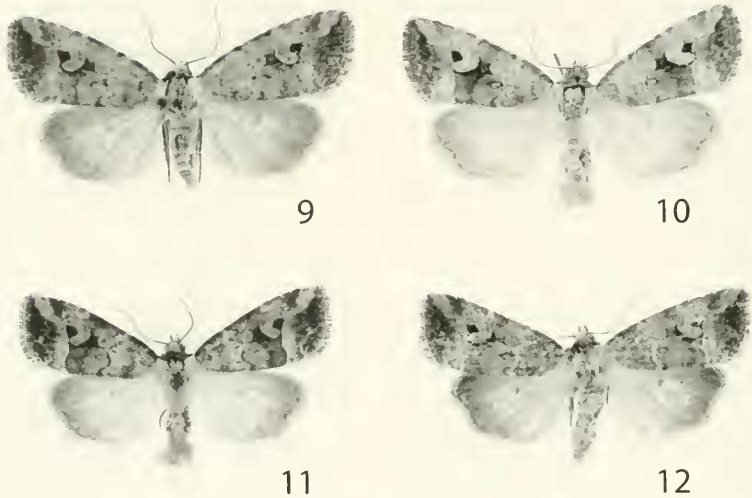
Erastria varia Walker (Figs. 3–4). The ♀ holotype [BMNH] is labeled: 1) Type, 2) ♀, 3) 432 [handwritten, yellow label], 4) glued on abdomen [handwritten], 5) colour slide, 224 [hand written], 6) 12. *Erastria varia*. [printed], 7) E. Florida, St Johns Bluff., E. Doubleday., 41.-7-29., 15 [handwritten].

Distribution (Fig. 20).—This species has principally a southeastern United States distribution. The collection localities range from southeastern Kansas and central Missouri, south to southern Texas, east to Florida, and north to North Carolina.

Material examined.—137 ♂ and 184 ♀, U.S.A.: ALABAMA: BALDWIN CO., 1 mi E Oyster Bay, T9S, R4E, sec 6, sand dunes, 10–14 Mar. 1990 (4 ♂, 5 ♀), Brown

?, genitalia slide MGP 1140; 1 mi E Oyster Bay, T9S, R4E, sec 7 NW, 13 Oct. 1990 (1 ♂), Brown; Bon Secour NWR, 1 Apr. 1994 (1 ♂), 17 Apr. 1994 (1 ♂), Pollock, 14 May 1994 (1 ♀), Seymour; Bon Secour NWR, foredunes, 17 Apr. 1993 (1 ♀), Brown, 15 Oct. 1996 (7 ♂, 3 ♀), Bon Secour NWR, hind dunes, 2 Apr. 1994 (1 ♂, 1 ♀), Pollock; Bon Secour NWR, T9S, R2E, Sec. 24, 11 Mar. 1990 (1 ♀), Brown, 12–14 Oct. 1991 (1 ♀), Brown and Pollock; Bon Secour NWR, T9S, R2E, Sec. 25, 14 Oct. 1990 (2 ♂, 2 ♀), Brown; Bon Secour NWR, T9S, R2E, Sec. 25N, 11 Oct. 1991 (1 ♂, 3 ♀), Brown and Pollock; Bon Secour NWR, T9S, R2E, Sec. 25S, 12–16 Oct. 1991 (9 ♂, 4 ♀), Brown and Pollock; Bon Secour NWR, T9S, R2E, Sec. 25S, dunes, 12–16 Oct. 1991 (1 ♂, 1 ♀), Brown and Pollock; Bon Secour NWR, T9S, R3E, Sec.

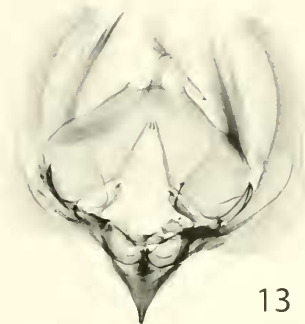
- 19NW, 11–15 Oct. 1991 (1 ♀), Brown and Pollock; nr. Bon Secour NWR, oak-pine forest, 17 Apr. 1993 (1 ♀), Brown and Pollock. DEKALB CO., DeSoto St. Pk., T6S, R10E, Sec. 19SE–20SW, 1,360–1,460 ft., 19 May 1990 (1 ♀), Brown and Pollock; DeSoto St. Pk., T6S, R10E, Sec. 31SW, 1,240 ft., 20–24 May 1990 (1 ♂, 1 ♀), Brown and MacGown; DeSoto St. Pk., 25–29 Sep. 1992 (1 ♂, 1 ♀), Brown and Pollock. LEE CO., 2.5 mi E I-85 & Hwy 29, 4 May 1995 (1 ♂), Brown and Vogt. JEFFERSON CO., Pinson, 30 Mar. 1986 (1 ♀), Brown. MONROE CO., Haines Island Park, 4–5 Apr. 1995 (2 ♂, 2 ♀), MacGown. ARKANSAS: LOGAN CO., Cove Lake, T7N, R25W, sec. 35SE, 1,020 ft., 14–20 May 1989 (1 ♀), Brown. FLORIDA: [no locality], (1 ♂, 2 ♀), ♀ genitalia slide JFG 1757. DUVAL CO., St. Johns Bluff, 20 Apr. 1962 (1 ♂, 1 ♀), 21 Apr. 1962 (1 ♀), Ferguson. HAMILTON CO., Suwannee River St. Pk., 10 Apr. 1987 (2 ♀), Steiner. HIGHLANDS CO., Archbold Biological Station, 12 Mar. 1997 (1 ♂, 12 ♀), ♀ genitalia slide USNM 46658, Pogue, 25 Mar. 1962 (1 ♀), Ferguson; Archbold Biological Station, Lake Placid, 17 Feb. 1985 (2 ♂), 18 Feb. 1985 (1 ♀), 19 Feb. 1985 (1 ♀), 20 Feb. 1985 (1 ♂), 21 Feb. 1985 (1 ♂), 22 Feb. 1985 (2 ♀), 25 Feb. 1985 (1 ♂), 28 Mar. 1962 (1 ♂), Ferguson. INDIAN RIVER CO., Vero Beach, Dec. (1 ♀), Mallock. LEON CO., Tall Timbers Research Station, 26–27 Sep. 1972 (1 ♀), Todd. MARTIN CO., Jonathan Dickinson State Park, 20 Mar. 1963 (1 ♀), Covell. PUTNAM CO., University Conservation Reserve, Welaka, 10 Mar. 1962 (1 ♀), 12 Mar. 1962 (1 ♂, 1 ♀), 15 Mar. 1962 (2 ♂), 21 Mar. 1962 (1 ♂), Ferguson; University Reserve, Welaka, 8 Apr. 1962 (1 ♂), 9 Apr. 1962 (1 ♂), 10 Apr. 1962 (1 ♂, 1 ♀), ♂ genitalia slide USNM 46243, ♀ genitalia slide USNM 46244, 12 Apr. 1962 (2 ♀), 15 Apr. 1962 (1 ♀), 19 Apr. 1962 (1 ♀), Ferguson. VOLUSIA CO., Cassadega, 24 Mar. 1965 (1 ♀), Fuller. WAKULLA CO., Ochlockonee River State Park, 10 Oct. 1983 (1 ♂, 1 ♀), Miller. GEORGIA: CHARLTON CO., Okefenokee National Wildlife Refuge, 20 Apr. 1962 (1 ♀), 21 June 1991 (1 ♀), 20 May 1991 (1 ♀), Ferguson; Okefenokee Refuge Headquarters, nr. Folkston, 2 May 1981 (1 ♀), 3 May 1981 (1 ♂), Ferguson. KANSAS: CRAWFORD CO., 4 mi E Pittsburg, 1–15 Sep. 1972 (1 ♂, 1 ♀), ♂ genitalia slide USNM 46260, Todd. DOUGLAS CO., Kansas University, 25 July 1937 (1 ♂), Fritz. LABETTE CO., Oswego, 2 Sep. 1965 (1 ♀), Hevel. KENTUCKY: CALLOWAY CO., Kenlake St. Pk., 16 Sep. 1979 (2 ♀), 17 Sep. 1979 (1 ♀), Cornett. MCCRAKEN CO., vic. Paducah, 24 July 1976 (1 ♀), Covell. LOUISIANA: BOSSIER PARISH: Barksdale Air Force Base, 18 Apr. 1996 (1 ♂), 24 Apr. 1996 (1 ♂), Pollock; Barksdale Air Force Base, calcareous prairie, 9 May 1996 (1 ♀), 14 Sep. 1996 (1 ♂), Pollock; Barksdale Air Force Base, shortleaf-pine forest, 24 Apr. 1996 (1 ♂), 1 May 1996 (1 ♂), 6 May 1996 (1 ♂, 1 ♀), 15 May 1996 (1 ♂), Pollock. MISSISSIPPI: FRANKLIN CO., Trib. of McGehee Crk., T6N, R4E, Sec. 26 SW, 8 Apr. 1992 (1 ♀), MacGown and Schiefer; GEORGE CO., 4.5 mi NNW Lucedale, T1S, R6W, Sec. 6 SE, 11 Mar. 1991 (1 ♀), Pollock, 29–30 Oct. 1989 (1 ♂, 4 ♀), Schiefer. HARRISON CO., Long Beach, 16 Oct. 1990 (1 ♀), 21 Oct. 1992 (1 ♂), Kergosien. HINDS CO., Clinton, 12 Apr. 1992 (1 ♂), Roshore, 23 Apr. 1966 (1 ♂), Mather; Jackson, 18 Mar. 1961 (1 ♀). JACKSON CO., 1 mi W Hwy 90 & 57, T7S, R8W, Sec. 25, 15 Apr. 1989 (1 ♂), Brown. LEE CO., Tombigee State Park, 1–23 Apr. 1993 (1 ♂, 2 ♀), 24 Apr.–7 May 1993 (1 ♀), Kergosien. LOWNOES CO., T19N, R16E, Sec. 30 SE, 17 Apr. 1991 (1 ♂), Pollock. OKTIBBEHA CO., Starkville, 13 May 1983 (1 ♂), Porter, 6 mi SW Starkville, 25 Apr. 1985 (1 ♀), 30 Apr. 1987 (1 ♀), Brown; A & M College, 29 Apr. 1931 (1 ♂), 18 June 1931 (1 ♀), Hutchins; T18N, R14E, Sec. 23, 18 Sep. 1987 (1 ♂), Brown. STONE CO., Sweetbay Bogs, T2S, R13W, Sec. 34 SW, 12 Mar. 1991 (1 ♀), Pollock. TISHOMINGO CO.,



Figs. 9–12. Adults of *Elaphria alapallida*. 9, ♂, Connecticut, New Haven Co., West Rock Park, 24 May 1986, D. C. Ferguson. USNMNT 00063085. 10, ♀, Connecticut, New Haven Co., Hamden, 14 June 1967, D. C. Ferguson. USNMNT 00063074. 11, ♂, Nova Scotia, Halifax Co., West Dover, 28 May 1955, D. C. Ferguson. USNMNT 00063370. 12, ♀, North Carolina, Ashe Co., Mt. Jefferson State Park, 4,150 ft., hairpin turn, 1 June 2000, J. B. Sullivan. USNMNT 00164817.

Tishomingo State Park, 11–12 Apr. 1986 (1 ♀), MacDonald. NORTH CAROLINA: BLADEN CO., Doe Island at Duck Pond (Bayfields), near White Oak, 9 Apr. 1994 (1 ♂), Broadwell. BRUNSWICK CO., 1 mi S Pretty Pond, Boiling Springs Lakes, 19 Apr. 1994 (2 ♂), Sullivan, Broadwell, Smith; Green Swamp, 29 Sep. 1994 (1 ♂, 1 ♀), Sullivan, Broadwell, Smith. CARTERET CO., Fort Macon State Park, brackish marsh, 5 Apr. 1997 (1 ♂), ♂ genitalia slide MGP 1135, Sullivan; Fort Macon State Park, hardwoods, 2 May 1996 (1 ♀), ♀ genitalia slide MGP 1136, Sullivan; Fort Macon State Park, brackish marsh, 13 Sep. 1996 (1 ♀), 14 Oct. 1996 (1 ♂), ♂ genitalia slide MGP 1139, Sullivan. COLUMBUS CO., Lake Waccamaw, 10 May 1985 (1 ♀), Steiner, Gerberich. DARE CO., 18 May 1977 (1 ♀), Gifford. MOORE CO., Weymouth Woods Natural Area, 4 Apr. 2000 (2 ♀), Hartley, Helms, Hall; Niagara, 24 Apr.

1954 (1 ♀), 25 Apr. 1954 (1 ♀), 30 Apr. 1954 (2 ♀); Southern Pines, 8 May 1986 (1 ♂), Steiner. NEW HANOVER CO., Carolina Beach State Park, E of Dow Rd., coastal fringe sandhill, 28 Apr. 1994 (1 ♂), Sullivan, Broadwell, Smith; Carolina Beach State Park, Limesink Area, coastal fringe sandhill, 23 Mar. 1994 (1 ♂), ♂ genitalia slide MGP 1133, 20 Sep. 1995 (1 ♂, 1 ♀), Sullivan, Broadwell, Smith; Fort Fisher Maritime Forest, coastal fringe evergreen forest, 13 Sep. 1994 (1 ♂), ♂ genitalia slide MGP 1138; MOTSU Buffer, Peter's Point, coastal fringe sandhills, 7 Mar. 1995 (1 ♂), ♂ genitalia slide MGP 1134, 20 Apr. 1994 (1 ♀), ♀ genitalia slide MGP 1137; 13 Sep. 1994 (1 ♂), 22 Sep. 1994 (1 ♂), 27 Sep. 1994 (1 ♀), Sullivan, Broadwell, Smith. ONSLOW CO., Camp Lejune, Corn Landing, *Juncus* marsh, 2 May 1996 (1 ♀), Sullivan. POLK CO., Tryon, 30 Apr. 1904 (1 ♀), 21 May (1 ♀), Fiske Coll.



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14



15



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Figs. 13–16. *Elaphria* species. ♂ genitalia. 13, *E. festivoidea*, North Carolina, Carteret Co., Fort Macon State Park, maritime shrub, 14 Oct. 1996, J. B. Sullivan, genitalia slide MGP 1139. 14, aedeagus and vesica of same specimen. 15, *E. alapallida*, West Virginia, Hardy Co., Lost River State Park, 29 June 1968, J. F. G. Clarke, USNM genitalia slide 46626. 16, aedeagus and vesica of same specimen.

OKLAHOMA: SEQUIA CO., Lake Tenkiller, 2 mi NW Blackgum, 25–29 Aug. 1982 (1 ♂, 3 ♀), ♂ genitalia slide USNM 46684, 14–16 July 1983 (1 ♀). DAVIS. SOUTH CAROLINA: CHARLESTON CO., Wedge Plantation, McClellanville, 26 Apr. 1980 (3 ♂, 2 ♀), ♂ genitalia slide USNM 46261, Ferguson; Charleston, 28 Apr. 1962 (1 ♀), Ferguson. Horry CO., Myrtle Beach, 21 Sep. 1940 (1 ♀), McElvare, 28 Sep. 1954 (1 ♀), McEvans, 30 Sep. 1953 (1 ♂). TEXAS: [no specific locality], (3 ♂, 3 ♀), ♂ genitalia slide JGF 1758. ANDERSON CO., Tennessee Colony, 5 Mar. 1967 (1 ♂, 1 ♀), ♂ genitalia slide USNM 46680, 12 Mar. 1962 (1 ♀),

Blanchard. BASTROP CO., Bastrop State Park, 27 Feb. 1965 (1 ♂), ♂ genitalia slide AB 666, 28 Feb. 1965 (1 ♂, 1 ♀), ♂ genitalia slide USNM 46679, Blanchard. BLANCO CO., Pedernales Falls State Park, 4 May 1973 (1 ♂), Blanchard. BOSQUE CO., Clifton, (1 ♂), Belfrage; Laguna Park, 24 Sep. 1970 (3 ♂, 2 ♀), ♂ genitalia slide USNM 46677, Blanchard. BOWIE CO., 5 mi N New Boston, 17 Sep. 1972 (1 ♂), Todd; 10 mi NW New Boston, 18 Sep. 1972 (1 ♂), Todd. BRAZOS CO., College Station, June (1 ♀), ♀ genitalia slide USNM 46661, Glick, 10–17 Aug. (1 ♀), Sep. (1 ♀). BROWN CO., Lake Brownwood State Park, 7 Sep. 1963 (1 ♂, 1 ♀),

Blanchard. CAMERON CO., Brownsville, 1–7 Mar. (1 ♂), 8–15 Mar. (1 ♂), 16 Mar. 1923 (1 ♂), 16–23 Mar. (2 ♂). CHAMBERS CO., Black Jack Springs, (1 ♂). COMAL CO., Guadalupe River, nr. New Braunfels, 12 Mar. 1972 (1 ♂), Blanchard. DALLAS CO., Dallas, (1 ♀), vic. Irving, 29 Mar. 1997 (1 ♂), 14 Apr. 1981 (1 ♀), 12 Sep. 1981 (1 ♀), 20 Sep. 1981 (1 ♂, 1 ♀), ♂ genitalia slide USNM 46659, Rahn. HARRIS CO., Houston, (1 ♀), Doll; Spring, 9 Mar. 1965 (1 ♂), Blanchard. HAYS CO., Freeman Ranch, 6 km NW San Marcos, 13 Mar. 1995 (1 ♀), ♀ genitalia slide USNM 46660, Steiner, Swearingen, Ott, Silverfine, JASPER CO., Town Bluff (Dam B), 10 Mar. 1965 (1 ♂), ♂ genitalia slide USNM 46239, Blanchard. KERR CO., Kerrville, 8 Mar. (1 ♀), ♀ genitalia slide JGF 1759, Lacy, (4 ♀), ♀ genitalia slide JGF 1761, Sep. 1902 (1 ♂), ♂ genitalia slide JGF 1760, Lacy, (5 ♂), ♂ genitalia slide USNM 46264. KIMBLE CO., Junction, 16 June 1972 (1 ♀), 17 June 1972 (1 ♀), 18 June 1972 (1 ♂, 2 ♀), Ferguson, 18 Sep. 1968 (1 ♀), Blanchard. LAMPASAS CO., 6.5 mi E Lampasas, 12 Mar. 1982 (8 ♂, 23 ♀), 2 ♂ genitalia slides USNM 46263, 46678, Poole. SAN SABA CO., Bend, 11 Mar. 1982 (5 ♂, 2 ♀), ♂ genitalia slide USNM 46682, Poole. ST. AUGUSTINE CO., 2 mi SW Broadus Lake Sam Rayburn, 20 Sep. 1972 (1 ♂, 3 ♀), Todd. TARRANT CO., Fort Worth, 9 Sep. 1963 (1 ♀), 30 Sep. 1963 (3 ♀), Jackh. TRAVIS CO., Bee Cave, 14 Apr. 1964 (2 ♀), ♀ genitalia slide USNM 46240, Blanchard. UVALDE CO., Sabinal, Mar. 1910 (1 ♀), 10 May 1910 (1 ♂), 1 ♂ genitalia slide USNM 46683, Pratt.

Discussion.—*Elaphria festivoidea* and *E. alapallida* are difficult to separate from localities where both occur unless comparing large series. In the extreme south (Florida and Alabama), only *festivoidea* occurs and in the north (Pennsylvania north) only *alapallida*. In other areas of the south and mid-Atlantic region both occur however, in North Carolina *festivoidea* is found in xeric,

sandy areas along the coast and inland to the sandhills and has multiple broods (principally April–May and September–October). *Elaphria alapallida* is in hardwood habitats from 2,000–6,000 feet and is single brooded (late April–June). Whether these habitat preferences hold true across the entire range of either species is yet to be determined.

The collection dates (Fig. 19) show that *E. festivoidea* is principally double brooded. Dates indicate that the first brood occurs from mid-February to the end of May with the second brood from late August to the end of October. The data shown are from the entire geographic range of *E. festivoidea*. These broods are certainly more defined if viewed from a more restricted range. For example, the dates in Florida range from mid-February to mid-April for the first brood and the only records are early October for the second brood. In Alabama the first brood is from mid-March to the end of May and the second brood is from the end of September to mid-October. In North Carolina the first brood is from end of March to mid-May and the second brood is from mid-September to mid-October.

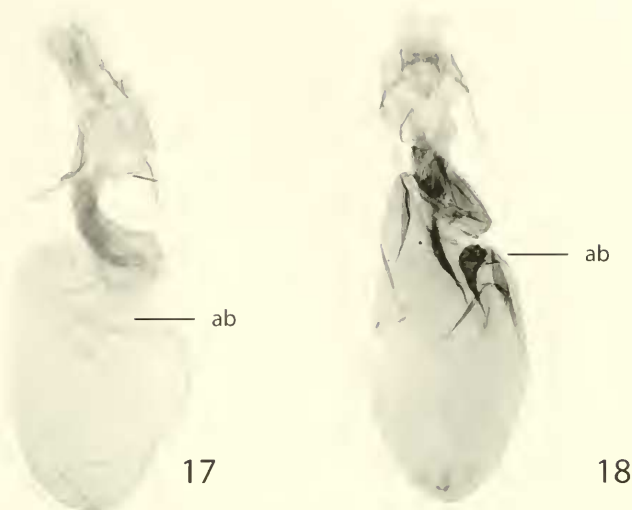
Elaphria alapallida Pogue and Sullivan,
new species

(Figs. 9–12, 15–16, 18, 21)

Elaphria festivoidea: Rockburne and Lafontaine 1976: 83 [misidentification].—Covell 1984: 135 [misidentification].—Rings et al. 1992: 100 (fig. 30, 35) [misidentification].—Saluke and Pogue 2000: 235 (figs. 1, 3–4), 237 (fig. 9), 238 (figs. 11–13), 239 (figs. 17–18), 240 (figs. 21–22), 241 (figs. 25, 27) [misidentification].

Diagnosis.—See the previous diagnosis section regarding the differences between *E. alapallida* and *E. festivoidea*.

Description.—*Male*: *Head*: Labial palp with basal and median segments black with a few scattered rufous scales, ventral margin and interior cream, apical segment



Figs. 17–18. *Elaphria* species, ♂ genitalia. 17, *E. festivooides*, Missouri, Benton Co., 4 mi NW Warsaw, along MO State UU, 7 May 1970, J. R. Heitzman, USNM genitalia slide 46699. 18, *E. alapallida*, West Virginia, Tucker Co., Blackwater Falls State Park, 24 June 1968, J. F. G. Clarke, USNM genitalia slide 46272.

cream with a few black and/or rufous scales. Frons with closely appressed scales cream, longer dorsal scales pale rufous to rufous with a varying amount of black scales forming a spot on eye margin where appressed and longer scales meet. Vertex concolorous with longer scales of frons. Antennal scape white ventrally, varying amounts of black and rufous dorsally; flagellum gray to black. *Thorax*: Patagium variable, can be rufous, brown, or light brown and mixed with varying amounts of black scales. Tegula white with a few darker scales. Dorsal tuft between patagia with cephalic half black to brown extending laterally to form a margin on tegula, rest white. Mesothorax very light brown. Metathorax very light brown with brown to gray apex. Foreleg with femur gray speckled with white; tibia gray with median band or spot cream to rufous, this lighter medial area may vary in amounts of lighter colored scales; tarsi gray with apical rings cream to

cream mixed with pink. Midleg with femur white speckled with brown scales; tibia with longer narrower scales in basal two-thirds cream mixed with pale rufous to pink, shorter scales in basal third black with white apical ring; tarsi black with white apical rings. Hindleg with femur and tibia mostly white mixed with gray scales; tarsi gray with white apical rings. *Forewing*: Length 10–13 mm ($n = 15$). Basal third ground color white; basal line black (indistinct to absent); antemedial line white, sinuate; orbicular spot, round, a few darker scales in center, bordered by black scales nearest reniform spot; claviform spot white to cream variably bordered by a few black scales; median line black, borders reniform spot to postmedian line; a trapezoidal area between orbicular and reniform spots can be completely filled with black; area between antemedial and postmedian lines and below orbicular and reniform spots a varying mixture of rufous, light brown, and gray

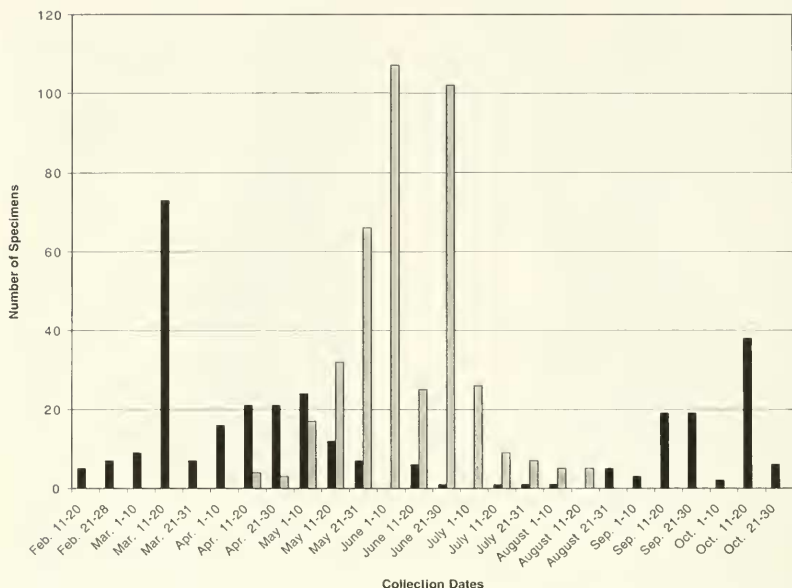


Fig. 19. Distribution of collecting dates of *Elaphria festivoidea* and *E. alapallida* from the material examined.

scales patches; reniform spot white with darker scales internally; postmedial line straight, white, with a few black scales along proximal border; basal third with an irregular white area bordering postmedian line and posterior margin; a white apical patch; gray along outer margin and rest with scattered rufous scales; fringe gray. *Hindwing*: Ground color white with indistinct pale gray margin; fringe white with darker basal line. *Abdomen*: Dorsal tuft on first abdominal segment absent; dorsum gray with an indistinct basal border of white scales; venter a mixture of white and gray scales. *Genitalia* (Figs. 15-16): Essentially same as *E. festivoidea* except; cornuti fewer (range 21-35, mean = 27.0, $n = 7$), longest cornutus (range 0.35-0.50 mm, mean = 0.393 mm, $n = 7$).

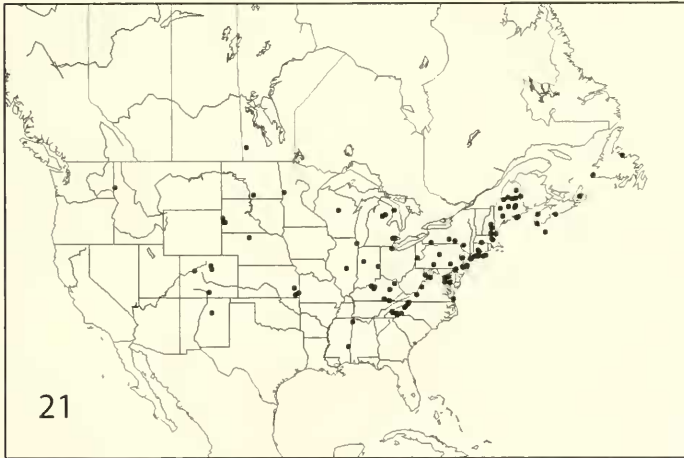
Female: As in male except forewing length 10-13 mm ($n = 15$). *Genitalia* (Fig. 18): Essentially the same as *festivoidea* ex-

cept; appendix bursae projects vertically from lateral margin of corpus bursae.

Type material.—The ♂ holotype [USNM] is labeled: 1) Hamden, New Haven Co., CONNECTICUT; 4. VI. 1966; D. C. Ferguson; 2) USNM ENT 00063094; 3) Holotype; *Elaphria alapallida*; Pogue and Sullivan. Paratypes: 265 ♂ and 188 ♀. CANADA: BRITISH COLUMBIA: Kaslo Creek, (1 ♂), ♂ genitalia slide JGF 1764, Dyar. MANITOBA: Miniota, (1 ♂), Gibbon. NEWFOUNDLAND: South Branch, 4 July 1949 (1 ♂), ♂ genitalia slide USNM 46311, Krogerus. NOVA SCOTIA: Bad-dock, Cape Breton Is., 30 July 1970 (2 ♂), Ferguson; Digby, (1 ♂), ♂ genitalia slide JGF 1762, 18 June 1908 (1 ♀), 25 June 1908 (1 ♀), 26 June 1908 (1 ♀), ♀ genitalia slide JGF 1763, Russell. ANNAPOLIS CO., South Milford, 23 June 1950 (1 ♀), Ferguson. HALIFAX CO., Bog E of Big Indian Lake, Halifax Watershed, 24 June

- 1962 (2 ♂), 24 June 1963 (1 ♂), 24 June 1968 (1 ♂), 26 June 1968 (1 ♀); Boulderwood, 26 June 1959 (1 ♂), 26 July 1959 (1 ♂); Halifax Watershed Area, 2 June 1955 (1 ♂), 5 June 1955 (1 ♂), ♂ genitalia slide USNM 46259, Ferguson; near Big Indian Lake, Halifax watershed, 24 June 1963 (1 ♂), Ferguson; Peggy's Cove, 11 July 1953 (1 ♀), Ferguson; Purcell's Cove, 6 June 1960 (1 ♀), 12 July 1962 (1 ♂), Ferguson; West Dover, 28 June 1955 (2 ♂), ♂ genitalia slide USNM 46258, 30 June 1968 (1 ♂), Ferguson. KINGS CO., Aylesford, 29 June 1962 (1 ♂), Ferguson; cattail swamp near Aylesford, 20 June 1963 (1 ♂), Ferguson; top of North Mt., near Garland, 11 June 1954 (1 ♀), Ferguson. LUNEN CO., Green Bay, 1 July 1956 (1 ♀), Ferguson. QUEENS CO., Lake Kejimukujik, 27 May 1958 (1 ♂), 17 June 1957 (1 ♂, 1 ♀), 3 July 1968 (1 ♂), Ferguson. YARMOUTH CO., Argyle, 7 June 1954 (1 ♂), Ferguson. ONTARIO: Hymers, 1-7 Aug. (1 ♂), U.S.A.: COLORADO: Vermeyjo R., 25 June (1 ♀), Packard. BOULDER CO., Mt. Flagstaff, 2,280 m, 20 June 1988 (1 ♂, 1 ♀), Peigler and Weissman. GARFIELD CO., Glenwood Springs, 16-23 July (1 ♂), ♂ genitalia slide USNM 46252. JEFFERSON CO., Chimney Gulch, 16 June 1920 (1 ♂), Oslar; Clear Creek, Oslar. CONNECTICUT: NEW HAVEN CO., Bethany, 17 May 1968, (1 ♀), Ferguson; Bethany Center, 17 June 1967 (1 ♂, 1 ♀), Ferguson; Hamden, 4 June 1967, (2 ♂), 9 June 1967 (1 ♂), 14 June 1967 (1 ♀), Ferguson; West Rock Park, 24 May 1966 (1 ♂, 1 ♀), Ferguson; Yale Preserve, 9 May 1964 (2 ♂), 21 May 1964 (1 ♂), 7 June 1964 (2 ♂, 1 ♀), ♂ genitalia slide USNM 46247, ♀ genitalia slide USNM 46248. DISTRICT OF COLUMBIA: (1 ♀), 30 June (1 ♀). DELAWARE: NEW CASTLE CO., Newark, 30 May 1983 (1 ♀), Bray. ILLINOIS: COOK CO., Evanston, 27 May 1895 (1 ♀). MACON CO., Decatur, 8 May 1915, (1 ♂). INDIANA: TIPPECANOE CO., Lafayette, 15 May 1916 (1 ♀), 9 Aug. 1915 (1 ♀), 13 Aug. 1915 (1 ♀). KENTUCKY: BELL CO., Pine Mountain State Park, 3 May 1974 (1 ♂), 13 May 1980 (1 ♂), Cornett. BULLITT CO., Bernheim Forest, 17 Apr. 1977 (2 ♂, 1 ♀), Brownell; 20 May 1999 (1 ♀), 21 May 1999 (1 ♂, 1 ♀), Vanderpool, Mt. Washington, 23 May 1966 (1 ♀), 28 July 1988 (2 ♂), Covell. CARTER CO., Carter Caves, 29 Apr. 1972 (1 ♀), Covell. JEFFERSON CO., Valley Station, 9 May 1974 (1 ♀), 15 May 1974 (1 ♂, 1 ♀), 25 May 1974 (1 ♀), 9 Aug. 1974 (1 ♀), 19 Aug. 1974 (1 ♀), Scholz. POWELL CO., Tunnel Ridge Rd., 21 May 1988 (1 ♂), Covell. RUSSELL CO., Lake Cumberland State Park, 18 July 1972 (1 ♀), Cornett. WHITLEY CO., Cumberland Falls State Park, 16 May 1980 (1 ♂), Cornett. MASSACHUSETTS: [County unknown], Beverly Farms, 10 June 1913 (1 ♂), Reiff; HAMPDEN CO., Chicopee, 2 June 1899 (1 ♀), Knab. MIDDLESEX CO., Auburndale, 13 June 1974 (1 ♂), Covell; Concord, 3 June 1913 (1 ♀), Reiff. MARYLAND: ANNE ARUNDEL CO., Southaven, 17 May 1991 (1 ♀), Stevenson. CALVERT CO., Camp Bay Breeze, nr Lusby, 8 June 1963 (1 ♀), Flint; Flag Ponds, 9 May 1991 (1 ♀), Stevenson. CECIL CO., Elkton, 29 May 1983 (1 ♀), Bray. PRINCE GEORGE'S CO., Patuxent National Wildlife Research Center, 12 May 1979 (1 ♂), ♂ genitalia slide USNM 46267, Ferguson. MAINE: [no county], Oguosoc, 6 July (1 ♀); top Mt. Bigelow, 7 July 1937 (1 ♀). AROOSTOOK CO., Ashland, 3 July 1943 (1 ♀); Houlton, 10 July 1945 (1 ♂). HANCOCK CO., Bar Harbor, 7 June 1937 (2 ♂), Brower, 22 June 1933 (1 ♀), 28 June 1933 (1 ♂), 1 July 1934 (1 ♂), Brower, 4 July 1934 (1 ♂), 10 July 1935 (1 ♀), Brower, 17 July 1933 (1 ♀), Brower, 19 July 1934 (1 ♂), 24 July 1933 (1 ♀), Brower; Mt. Desert Is., 13 June 1932 (1 ♂), 23 June 1932 (1 ♀). KENNEBEC CO., Mt. Vernon, 10 June 1967 (1 ♀), Dearborn. PENOBSCOT CO., Lincoln, 5 July (1 ♀), 6 July (1 ♀), 7 July 1935 (2 ♂), 10 July 1935 (1 ♂, 1 ♀), 18 July 1937 (1 ♂); Passadumkeag, 1 June 1936 (1 ♂), ♂ genitalia slide

- USNM 46253, 18 June 1938 (1 ♂); Patten, 26 July (1 ♀). PISCATAQUIS CO., Chesuncook, 13 July (1 ♀); Mt. Katahdin, 9 July 1939 (1 ♀); Sebec Lake, 24 June 1930 (3 ♂, 2 ♀), 16 June 1923 (1 ♂). SOMERSET CO., Pittston Farm, 9 July (1 ♂). MICHIGAN: CRAWFORD CO., 5 mi W of Roscommon, 19 May 1938 (2 ♂), 29 May 1938 (5 ♂). MONTGOMERY CO., Atlanta, 31 May 1936 (1 ♂, 1 ♀), 31 May 1938 (1 ♂), McAlpine. OAKLAND CO., Franklin, 24 May 1936 (1 ♂, 1 ♀), ♂genitalia slide USNM 46252, 2 June 1934 (1 ♂, 1 ♀), 2 June 1932 (1 ♀), 4 June 1937 (1 ♂), McAlpine; Royal Oak, 14 May 1915 (1 ♂), McAlpine. OSCODA CO., Luzerne, 4 June 1944 (1 ♂), Rawson. NORTH CAROLINA: ALLEGHANY CO., 7 mi. N. Sparta, 2,700 ft., 10 June 1974 (1 ♂, 1 ♀), Sullivan; New River State Park, Oliver Farm, 2,600 ft., 1–4 June 2000 (2 ♂, 2 ♀), Sullivan. ASHE CO., Mt. Jefferson State Park, hairpin turn, 4,150 ft., 1 June 2000 (14 ♂, 7 ♀), Sullivan; Mt. Jefferson State Park, park offices, 3,080 ft., 2–3 May 2000 (6 ♂, 1 ♀), 1 June 2000 (3 ♂), Sullivan; Mt. Jefferson State Park, summit, 4,600 ft., 1 June 2000 (18 ♂, 8 ♀), Sullivan. AVERY CO., Grandfather Mountain, 4,850–5,150 ft., 30–31 May 2000 (1 ♂, 1 ♀), Sullivan; Grandfather Mountain, Visitor Ctr., 5,150 ft., 25–27 June 2000 (1 ♂), Sullivan; Moore Mt., 4,000 ft., 30–31 May 2000 (3 ♂, 2 ♀), Sullivan. HAYWOOD CO., Wagon Gap, 4,533 ft., 20 May 2001 (10 ♂), 26–27 June 2001 (6 ♂, 5 ♀), Sullivan; Black Balsam Mt., 5,800 ft., 26–27 June 2001 (5 ♂), Sullivan; mile post 415, Blue Ridge Pkwy., 4,800 ft., 27 June 2001 (2 ♂, 2 ♀), Sullivan; 155 Mt. Pisgah Rd., 2,900 ft., 20 May 2001 (2 ♂), 25 June 2001 (2 ♂), Sullivan and Deutschman; US 276 below Wagon Gap Rd., 3,776 ft., 23 April 2001 (2 ♂), 20 May 2001 (1 ♂, 3 ♀), 26–27 June 2001 (5 ♂, 3 ♀), Sullivan and Deutschman; Wagon Gap Rd. on US 276, 20 May 2001 (4 ♂, 5 ♀), 23 June 2001 (5 ♂, 2 ♀), 26–27 June 2001 (2 ♀), Sullivan and Deutschman. HENDERSON CO., Bat Cave, 26 May 1970 (1 ♀), Covell. SWAIN CO., Cherokee, Big Cove Road, Great Smoky Mountains National Park, 2,062 ft., 21 May 2001 (2 ♀), Sullivan and Deutschman, 30 May 2001 (1 ♀), Sullivan; Thomas Divide trailhead, Great Smoky Mountains National Park, 4,580 ft., 21 May 2001 (4 ♂), Sullivan; Great Smoky Mountains National Park, Big Cove Rd., 2,064 ft., 30 May 2001 (1 ♀), Sullivan and Deutschman. NORTH DAKOTA: EMMONS CO., 16 mi E Linton, 20 June 1975 (3 ♂), Lago. NORTH CASS CO., Red River, Fargo, 9 June 1961 (1 ♂), Poole. NEBRASKA: CHERRY CO., Fort Niobrara, 14 June 1983 (1 ♂), Ferguson; Hackberry Lake, Valentine NWR, 18 June 1983 (1 ♂), Ferguson. NEW HAMPSHIRE: Squam Lake, July 1925 (1 ♀), Allen. BELKNAP CO., Center Harbor, (1 ♂). HILLSBOROUGH CO., Manchester, (1 ♀). ROCKINGHAM CO., Hampton, 3 June 1902 (1 ♂), 4 June 1940 (1 ♂), 21 June 1931 (1 ♀), Shaw. NEW JERSEY: BURLINGTON CO., Medford Township, Lake Pine, 7 June 1973 (3 ♂, 2 ♀), 16 Aug. 1974 (1 ♀), Rentz. HUNTERDON CO., Woodglen, 13 June 1971 (1 ♀), 22 June 1971 (1 ♀). OCEAN CO., Lakehurst, (1 ♂), May 1929 (1 ♂, 1 ♀), Lenner, May 1925 (1 ♀); Wrangle Brook Rd., Lakehurst, 30 May 1956 (1 ♂, 3 ♀), 2 ♀ genitalia slides USNM 46268, 46271, 31 May 1956 (2 ♂, 3 ♀), 3 June 1956 (4 ♂, 2 ♀), ♂genitalia slide USNM 46250, 7 June 1956 (2 ♂), 8 June 1956 (2 ♂, 3 ♀), Ferguson. NEW MEXICO: SAN MIGUEL CO., Las Vegas, (2 ♂), ♂genitalia slide USNM 46255. NEW YORK: [no specific locality], (2 ♂, 3 ♀), ♀ genitalia slide JGF 1756. Centre, 21 May 1877 (1 ♂), ♂genitalia slide JGF 1755. Hill. CATTARAUGUS CO., Allegany State Park, 10 Sep. 1940 (1 ♀), Shadle. CHENANGO CO., Greene, 2500 ft., (1 ♂), June (2 ♂), Howard. KINGS CO., Brooklyn, 18 June 1902 (1 ♂), 20 June 1901 (1 ♂), ♂genitalia slide USNM 46265. QUEENS CO., Woodhaven, Long Island, (1 ♂). SUFFOLK CO., Amagansett, Long Island, 30 May 1913 (1 ♀), Englehardt; East, Long



Figs. 20–21. Collecting localities. 20, *Elephria festivoides*. 21, *E. alapallida*.

Island, 14 May 1902 (1 ♀), 22 May 1902 (1 ♀), 5 June 1900 (2 ♀), Weeks, 5 June 1901 (1 ♂), Weeks; Eatons Neck, Long Island, 10 June 1971 (1 ♀), Jackh; Penniquid Barrens, Coram, Long Island, 20 Aug. 1920 (1 ♀). SULLIVAN CO., Debruce, 9 July 1916 (1 ♂). TOMPKINS CO., Ithaca, 22

May 1965 (2 ♂), Ferguson; McLean Bogs Reserve, 15 June 1957 (1 ♀). DAVIS, OHIO: ATHENS CO., Waterloo Township, Sec. 33, at a beaver dam, 23 May 1981 (1 ♀). Metzler. LUCAS CO., Holland, 10 May 1936 (1 ♂). RAWSON. PENNSYLVANIA: BEAVER CO., New Brighton, 25 May

1902 (1 ♀), 31 May 1902 (1 ♀), 1 June 1902 (2 ♂, 1 ♀), 2 June 1918 (1 ♂), 11 June 1901 (1 ♂), Merrick, CENTRE CO., Howard, 31 May 1979 (1 ♀), Haas, LANCASTER CO., Lititz, Aug. 1924 (1 ♂), ♂ genitalia slide JGF 1765, Heiserman. SOUTH DAKOTA: LAWRENCE CO., Cheyenne Crossing, 5,600 ft., 1 July 1997 (1 ♂), Rahn. PENNINGTON CO., Hill City, 5 July 1964 (1 ♂, 1 ♀), Ferguson; Slate Creek, 9 mi NW of Hill City, Black Hills, 6,000 ft., 4 July 1964 (1 ♂, 2 ♀), Ferguson; Upper Spring Creek, near Hill City, Black Hills, 27 June 1964 (2 ♂, 5 ♀), ♀ genitalia slide USNM 46246, 28 June 1964 (5 ♂, 2 ♀), ♂ genitalia slide USNM 46245, Ferguson. VIRGINIA: [no specific locality], (1 ♂), BATH CO., 2.6 mi E of Warm Springs, 8 June 1956 (1 ♀), Hevel. FAIRFAX CO., Alexandria (Rose Hill), 24 July 1976 (1 ♂), Opler. MONTGOMERY CO., Brush Mountain, 14 May 1963 (1 ♂), 18 May 1963 (1 ♂), Covell. CITY OF VIRGINIA BEACH, Seashore State Park, 1–4 June 1975 (3 ♂), Davis. WISCONSIN: MARATHON CO., Township of Stettin, 4 June 1975 (1 ♂), 17 June 1975 (1 ♀), Rahn. WEST VIRGINIA: TUCKER CO., Blackwater Falls State Park, 23 June 1968 (1 ♂, 9 ♀), 24 June 1968 (4 ♂, 22 ♀), ♂ genitalia slide USNM 46262, ♀ genitalia slide USNM 46272, Clarke. HARDY CO., Lost River State Park, 29 June 1968 (1 ♂), ♂ genitalia slide USNM 46626, Clarke; near Lost River State Park, 4–6 July 1980 (1 ♂), Miller. MORGAN CO., 4 mi SW Grand Cacapon, 19 Aug. 1989 (1 ♀), Clarke, McIntyre. Paratypes were deposited in the following institutions: American Museum of Natural History, New York, NY; The Natural History Museum, London, Great Britain; Field Museum of Natural History, Chicago, IL; Los Angeles County Museum of Natural History, Los Angeles, CA; Mississippi State University, Mississippi State, MS.

Distribution (Fig. 21).—Most records are from the northeastern U.S. and Nova Scotia, Canada. It extends as far south as the

mountains of North Carolina and west to western British Columbia and south to Colorado and New Mexico.

Discussion.—*Elaphria alapallida* has been masquerading as *E. festivooides* in the North American literature (Rockburne and Lafontaine 1976, Covell 1984, Rings et al. 1992). After examination of the types of *festivooides* and *varia* and comparing these with similar Florida specimens it was determined that the southern species was *E. festivooides* and the more northern species was *E. alapallida*.

The collection dates (Fig. 19) show that *E. alapallida* is single brooded. Dates range from the end of April to mid-August across its geographical distribution. The data shown are from the entire geographic range of *E. alapallida*. These broods are certainly better defined if viewed from a more restricted range. For example, the dates in North Carolina are from late April to the end of June, in Connecticut from mid-May to mid-June, in Maine from early June to the end of July, and in Nova Scotia from the end of May to the end of July.

Etymology.—The specific epithet, *alapallida*, refers to the pale hindwing with the Latin terms *ala* referring to the hindwing and *pallida* referring to the pale coloration as compared to the darker hindwing of *E. festivooides*.

CONCLUSIONS

With the recognition of *alapallida* the *festivooides* complex of the genus *Elaphria* consists of three very similar species. Accurate determination of the three species by maculation is extremely difficult without a known series of each species. However, males are easily placed by dissection of the genitalia. *Elaphria cornutinis* is the only species of the complex with ventral abdominal pouches and coremata (Saluke and Pogue 2000). Males of the remaining two species can be distinguished by forewing size and the number and size of the cornuti on the inflated vesica. They can also be separated by the color of the hindwing which is

whitish in *alapallida* and gray in *festivoi-des*. The hindwing of *cornutinis* is intermediate but closer to gray. The female of *festivoi-des* is distinguished by the longer appendix bursa. Females of *alapallida* and *cornutinis* are extremely difficult to separate on characters of the genitalia. However, the female of *alapallida* has a lighter hindwing color and the female forewing of *cornutinis* has a more mottled pattern. In North Carolina, the three species are largely allopatric. *Elaphria festivoi-des* is limited to xeric, white sand habitats in eastern North Carolina where it occurs with such uncommon species as *Catocala jair* Strecker, *Zale declarens* (Walker) (Noctuidae) and *Heterocampa varia* Walker (Notodontidae). It is common in the early spring and late fall with stragglers throughout the summer. It overlaps *E. cornutinis* in the sandhills, where both occur at Weymouth Woods Natural Area in Moore County. There *festivoi-des* is in the dryer, sandy habitats and *cornutinis* is in mesic woodlands. *Elaphria cornutinis* is common in mesic woodlands across the piedmont of North Carolina and up to an elevation of about 2,200 feet in the mountains. There it overlaps with *E. alapallida*, but the species appear to be in different habitats. *Elaphria cornutinis* is in the more xeric woodlands where *Vaccinium* species are common. At altitudes below 2,500 feet *E. alapallida* is infrequent but becomes abundant from 3,000–5,000 feet throughout the montane forests of the state and has been collected as high as 5,800 feet. *Elaphria alapallida* is single brooded in the spring while *E. cornutinis* has multiple broods beginning in April–May with a strong flight and showing stragglers throughout the summer but no strong fall flight.

The food plant of *E. alapallida* was reported to be *Acer negundo* Linnaeus by Rockburne and Lafontaine (1976) but the distribution of that plant species does not coincide with the distribution of *alapallida* in North Carolina (Radford et al. 1968). It does match the distribution of *E. cornutinis*

but that species does not reach Canada, the origin of the food plant record. The food plants of species of *Elaphria* in the eastern U.S. are poorly known in spite of the abundance of adults. Wagner et al. (1997) reared *E. versicolor* on algal layers on tree bark. If this feeding strategy occurs in other species of the genus, it may explain why larvae are seldom located.

The genus *Elaphria* as currently conceived, contains 127 species (Poole 1989, Saluke and Pogue 2000, and *E. alapallida* added here). The genus is largely Neotropical but one species occurs in Europe, one in Africa, one in China, three in India, and 14 in North America. The genus has never been revised nor delineated in any detail although Forbes (1954) briefly describes generic characters. Dissections of some 25 species from the Americas indicate that the genus is polyphyletic. The type species is *E. grata* (Hübner), which appears to have rather typical and unspecialized genitalia. The genitalia of the species in the *festivoi-des* complex are somewhat specialized, particularly the two parallel rows of cornuti in the sinuate vesica in the male and the short ductus bursae in the female. Perhaps the closest relative to the complex is *E. agrotina* which has a similar maculation, abdominal pockets and coremata, two short rows of cornuti on a sinuate vesica and a short sclerotized ductus bursae.

Saluke and Pogue (2000) suggested that the presence of abdominal pockets and coremata in *E. cornutinis* could indicate that this species reveals conspecifics chemically by the use of pre-mating pheromones. The geographic range of *E. cornutinis* largely divides *E. festivoi-des* from *E. alapallida*. The distribution of abdominal pockets and coremata is sporadic in *Elaphria* species and may represent a pattern of expression rather than absolute genetic gain or loss of a complex character (Poole 1995). It may be involved in rapid speciation, perhaps even sympatric speciation. The presence or absence of such a pheromone system is also found in other very closely related species

pairs of noctuids (*Euagrotis*, *Lacinipolia* and probably others). One can imagine alleles at very low frequencies which allow the expression in males of the pheromone apparatus or the reception of the pheromone in females. In time, the occurrence of the alleles in individuals of both sexes may occur at a single locality producing offspring which could utilize the pheromone system as an isolating mechanism, and over time allow for habitat specialization to avoid direct competition in the larval stages. The *festivoides* complex may offer a convenient model for the study of rapid speciation and pheromone dependency.

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